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GB 2241460 A EP 0608152 A1 EP 0519661 A1
EP 0312422 A1 EP 0277268 A1

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(54) **Rotary die cutter with magnetic holders**

(57) A device for cutting off lateral edges from paper cuttings to be cut out from a strip of material has a cutter plate mount on a cutter shaft 10. The cutter shaft 10 is of an axial length to match the width of the paper cutting and has a plurality of retaining magnets 15 arranged at the ends thereof, distributed around the circumference. An axial bore 17 communicates with a radial bore 18 and thence to an elongate groove 19. A tongue 20 inserted into the groove has radial bores 21 communicating with grooves 22. Alternate supply of vacuum and pressure to bore 17 allows web material to be attached and detached from the die cutter.

Fig. 1

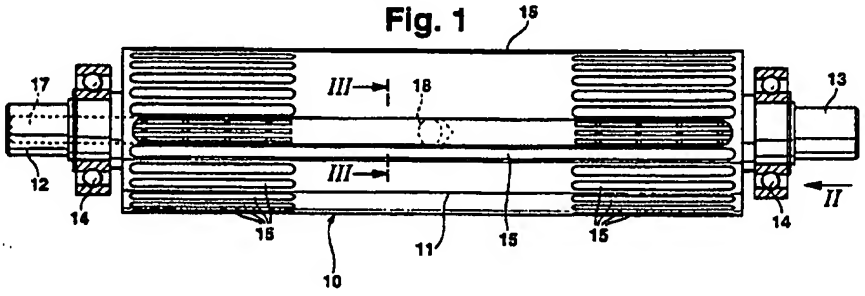
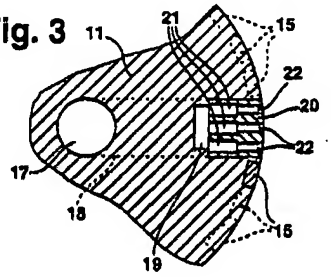


Fig. 3



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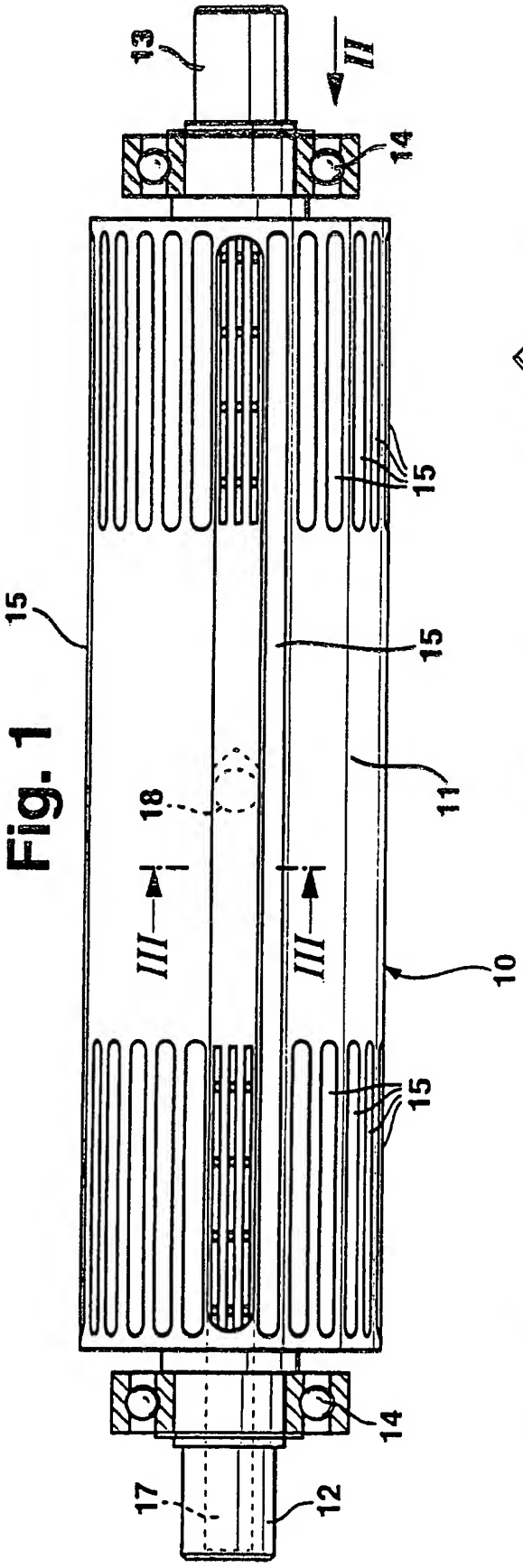

Fig. 1

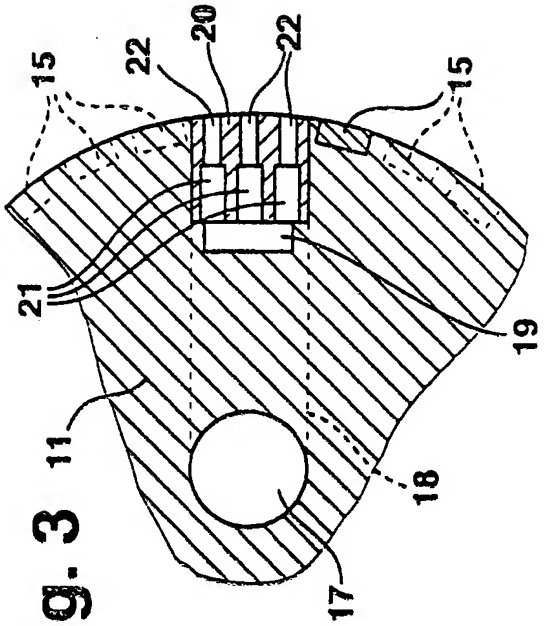

Fig. 3

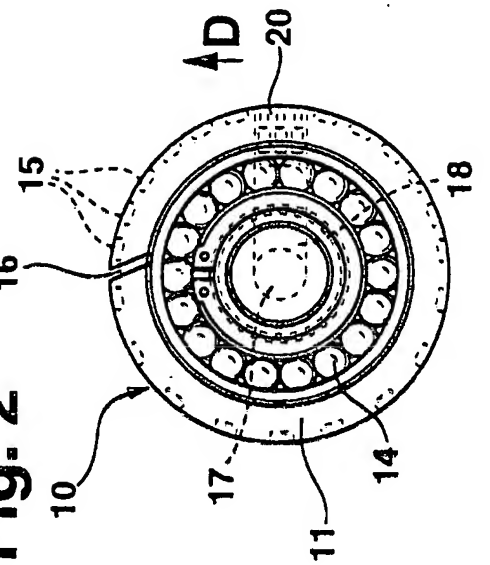

Fig. 2

Device for cutting the lateral edges of paper cuttings

The invention relates to a device for cutting the lateral edges of paper cuttings to be cut out from a strip of material, having a cutter plate which can be mounted on a cutter shaft, for which retaining magnets are provided, these being inserted around the circumference of the cutter shaft and extending in the axial direction.

This type of device is used in particular to make paper cuttings of the type used for envelopes. The material stock is fed through several cutter shafts and counter-rolls and the lateral edges are trimmed off during one of the work processes. The two cutter shafts, which in some circumstances are linked to one another by means of a coupling, can be axially adjusted relative to one another so as to adjust the format of the paper cutting.

The underlying task of the invention is to provide a more simplified device of the type outlined above.

According to the present invention there is provided a device for cutting off lateral edges from paper cuttings to be cut out from a strip of material, having a cutter plate mountable on a cutter shaft, for which retaining magnets are arranged extending in the axial direction, wherein the cutter shaft is of an axial length to match the width of the paper cutting and, for the purposes of retaining a cutter plate extending essentially across the entire axial length of the basic body of the cutter shaft and having cutters for the two lateral edges, a plurality of retaining magnets is arranged at the ends thereof, distributed around the circumference.

Compared with the conventional system in which two short cutter shafts are used, a cutter shaft of this type requires somewhat more material but considerable savings are made in terms of the drive and other devices, which means that overall, this is a more conomic solution. The process of adjustment to match the format of the paper cuttings can be effected in a simple manner, particularly as regards paper

cuttings for envelopes, because cutt r plates with cutting edges calibrat d to suit the two lateral edges are used.

In other embodiments of the invention, provision is made so that the cutter shaft has an axial bore communicating with an axially arranged passage, with which orifices opening in the region of the two rows of retaining magnets connect. A pressure at below atmospheric pressure is applied to the axial bore, and in turn the orifices across a portion of the circumferential path of the cutter shaft, in order to hold the paper cutting against the cutter plate by means of suction. At one specific point of the circumferential movement, a pressure above atmospheric pressure is applied to the axial bore and in turn the orifices so that the paper cutting is blown off at a predetermined point and released from the cutter plate. Since only one axial bore needs to be provided for the cutter shaft designed to cut the two lateral edges, the means used to switch over from suction air to air blast can also be simplified.

In one advantageous embodiment, the design is such that the cutter shaft is provided with a longitudinal groove and, inserted into this groove but at a distance from the floor thereof, is a tongue having a plurality of orifices in the region of the row of retaining magnets. This allows for a good distribution of both the suction air flow and the air blast from a central point to the orifices in the region of the two rows of the retaining magnets.

In another embodiment of the invention, provision is made so that the orifices are arranged within longitudinal shafts of the tongue. This means that air is distributed between the orifices of the cutter shaft and the orifices of the cutter plate so that the latter do not have to be accurately aligned with the orifices of the cutter shaft.

Other features and advantages will become clear from the following description of embodiments illustrated in the drawings:

Fig. 1 shows a radial view of a cutter shaft of a device for cutting the lateral edges of paper cuttings to

be cut out from a strip of material,

Fig. 2 is an axial view of the cutter shaft of Fig. 1 in the direction of the arrow II and

Fig. 3 is a partial section along the line III-III of the cutter shaft of Fig. 1.

The cutter shaft 10 has a roll-shaped basic body 11, which is provided at each end face with bearing journals 12, 13, which are mounted in a machine with roll bearings 14 and, although not illustrated, are connected on one side to a drive. The roll-shaped basic body 11 receives a cutter plate having two cutting edges which are used to cut the lateral edges of a paper cutting to be cut from a material stock, in particular paper cuttings for an envelope. In the region of its two lateral ends, the basic body 11 is provided with retaining magnets 15, which are set into recesses around the circumference of the basic body 11 and extend in an axial direction from the ends respectively over about one quarter of the axial length of the basic body 11. The retaining magnets 15 are made from rare-earth metals. They are bonded into the grooves machined in the basic body, the circumference of which is put through a process of cylindrical grinding, once the retaining magnets 15 have been fixed in position.

The roll-shaped basic body 11 is provided with an axial slit 16, which, being at a tangent to the circumference of the basic body 11 forms an acute angle against the operating direction of rotation arrow D in Fig. 2. The cutter plate, which has a chamfered edge, is suspended from this slit 16 and then laid around the roll-shaped basic body 11. The retaining magnets 15, which are located in the region of the cutting edges of the cutter plate, ensure that the cutting plate lies tight against the basic body 11 at least in the region of the cutting edges.

Some of the individual retaining magnets 15 extend more or less over the entire length of the roll-shaped basic body, i.e. also across the middle region. These co-operate with the retaining magnet 15 located adjacent to the slit 16 and that at the beginning of the cutter plate. An additional

r taining magnet extending across the middle region is arranged at slightly over 90°. Another end-to-end magnet can also be arranged in the region of the end of the cutter plate before the slit 16.

Starting from the bearing journals 12, the cutter shaft 10 is provided with an axial bore 17, which extends more or less to the middle of the cutter shaft 10. Connecting with this axial bore, approximately in the middle of the cutter shaft 10, is a radial bore 18. The radial bore 18 opens in a longitudinal groove 19, which is open to the circumference of the roll-shaped basic body 11. Inserted into this longitudinal groove 19 is a tongue 20, which runs flush with the circumference of the roll-shaped basic body 11. The tongue 20 remains at a distance from the floor of the longitudinal groove 19, so as to form a passage extending in the axial direction on either side of the radial bore 18. In the region of the two rows of retaining magnets 15, the tongue 20 is provided with bores 21 arranged in three rows extending from the inner side over about half of the length of the tongue 20. Axial grooves 22 are machined into the tongue 20 as an extension of the bores 21.

The axial bore 17 can be connected alternately by means of a switching device, not illustrated in any detail, from a source of air below atmospheric pressure and to a source of pressurised air. An under-pressure is applied to the axial bore 17 across one portion of the circumferential path of the cutter shaft 10 so that the paper cutting trimmed at its two edges is retained against the cutter shaft 10, i.e. against the cutter plate in the region of the grooves 22 where boring is provided. Consequently, the paper cutting is moved along a different path from that of the remaining web-shaped material strip which remains behind from outside of the lateral edges. At a predetermined point of the circumferential path, the switching device switches so that a flow of pressurised air is applied to the axial bore 17 and in turn the grooves 22 so that the paper cutting is then released at this point. The cutter plate, not illustrated, covers the two

nd areas of the tongue 20 so that the flow of suction air is distributed within the gr ov s 22 between the rear face of the cutter plate and the grooves 22 onto the boring. The boring of the cutter plate is selected so that it lies between the respective cutting edges arranged at the two peripheral edges and thus produces a flow of suction air there.

In a slightly different embodiment, the design is such that an axial bore corresponding to the axial bore 17 extends over the entire length, i.e. from the bearing journal 12 to the bearing journal 13. In this instance, a valve to control the under-pressure to be applied can be arranged in the region of one of the bearing journals 12 or 13 and a valve controlling the inflow of pressurised air can be arranged in the region of the other bearing journal 13 or 12.

As may be seen from Figs. 1 and 3 in particular, the retaining magnet 15 after the tongue 20 in the circumferential direction is designed as an end-to-end retaining magnet in the axial direction extending across the two rows of retaining magnets 15.

Claims

1. A device for cutting off lateral edges from paper cuttings to be cut out from a strip of material, having a cutter plate mountable on a cutter shaft, for which retaining magnets are arranged extending in the axial direction, wherein the cutter shaft is of an axial length to match the width of the paper cutting and, for the purposes of retaining a cutter plate extending essentially across the entire axial length of the basic body of the cutter shaft and having cutters for the two lateral edges, a plurality of retaining magnets is arranged at the ends thereof, distributed around the circumference.

2. A device as claimed in claim 1, wherein the cutter shaft is provided with an axial bore, which connects with an axially oriented passage, connecting with orifices opening in the region of the two rows of retaining magnets.

3. A device as claimed in claim 2, wherein the basic body of the cutter shaft is provided with a longitudinal groove, into which, at a distance from the floor of the longitudinal groove, a tongue is inserted, which is provided with a plurality of orifices in the region of the pluralities of retaining magnets.

4. A device as claimed in claim 3, wherein in the region of the orifices, the tongue is provided with longitudinal grooves towards the exterior.

5. A device as claimed in any one of claims 1 to 4, wherein at least one retaining magnet extends more or less across the entire axial length of the basic body of the cutter shaft.

6. A device for cutting off lateral edges from paper cuttings to be cut out from a strip of material, substantially as described herein with reference to, and as illustrated in, the accompanying drawings.

The Patent Office

Application No:	GB 9702785.8	**Examiner:**	Hal Young
Claims searched:	1-6	**Date of search:**	21 April 1997

Patents Act 1977
Search Report under Section 17

Databases searched:

UK Patent Office collections, including GB, EP, WO & US patent specifications, in:

UK Cl (Ed.O): B4B

Int Cl (Ed.6): B26D(1/34, 36, 40 ; 7/26) ; B26F(1/44)

Other: ONLINE DATABASES: WPI

Documents considered to be relevant:

Category	Identity of document and relevant passage		Relevant to claims
X	GB 2241460 A	(SIMON), see whole document.	1
X	EP 0608152 A1	(MAGNAFLEX), see figs 3, 5-9 and note lines 43-56 of column 8.	1,2,5
X	EP 0519661 A1	(BILLSDON et al), see figs 6,7 and note magnetic strips 14 and air holes 26.	1,2,5
X	EP 0312422 A1	(BULAND), see figs and note magnets 9 and air holes 10,14.	1,2,5
A	EP 0277268 A1	(ENVELOPPE), see figs and note air holes 16,46,47.	1

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Y	Document indicating lack of inventive step if combined with one or more other documents of same category.	P	Document published on or after the declared priority date but before the filing date of this invention.
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